Subject: Julian Day Numbers

Posted by Ben Tupper on Tue, 14 Nov 2000 08:00:00 GMT

Hello,

You may have heard the proverb, 'A person with two watches doesn't know what time it is.'   It seems to be true for me.

I have been tinkering with making tidal predictions which, of course, are dependent upon time. A number of benchmark dates
are used to establish the phase difference for each harmonic component calculated. One of the benchmark dates is Noon, Jan 1, 1900.

```
IDL> Print, JulDay(1,1,1900,12,0,0)
    2415021.0
```

However, this is just in from a reliable source...

* From the "Explanatory Supplement to the Astronomical Ephemeris" 1992, p.699
* 1900 JAN 0.5 = JD 2415020.0.

Note the one (1) Julian Day difference. Ugh!

There are a couple of things I could do I guess:

(1) Assume that RSI is ahead of its time, and just charge ahead.
(2) Reduce the Julian Day number by one (I hate to do that since I don't know why I need to.)
(3) Pass different arguments to JULDAY ...
```
    IDL> Print, JulDay(1,0.5,1900)
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```
    This item is really just like (2) since JULDAY converts the input arguments to long integers before processing.
(4) Use the paper tide table published by the local fishermen's cooperative.
(5) Post a timely (sorry) question to the newsgroup regarding what to make of the 1 day difference.

Thanks,

Ben

P.S.
The IDL JULDAY code cites the following reference, but I
don't have it handy to check into.
; Translated from "Numerical Recipies in C", by William H.
Press,
; Brian P. Flannery, Saul A. Teukolsky, and William T.
Vetterling.
; Cambridge University Press, 1988 (second printing).

--
Ben Tupper
248 Lower Round Pond Road
POB 106
Bristol, ME 04539

Tel: (207) 563-1048
Email: PemaquidRiver@tidewater.net

Subject: Re: Julian Day Numbers
Posted by thompson on Tue, 14 Nov 2000 08:00:00 GMT
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Ben Tupper <pemaquidriver@tidewater.net> writes:

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> doesn't know what time it is.'   It seems to be true for me.

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> of course, are dependent upon time. A number of benchmark
> dates
> are used to establish the phase difference for each harmonic
> component calculated. One of the benchmark dates is Noon,
> Jan 1, 1900.

> IDL> Print, JulDay(1,1,1900,12,0,0)
>   2415021.0

Using completely independent software, I can verify that this is correct.

> However, this is just in from a reliable source...

> * From the "Explanatory Supplement to the Astronomical
> Ephemeris" 1992, p.699

> * 1900 JAN 0.5 = JD 2415020.0.

This is also correct. The date-time you used in the first calculation would be written as "1900 JAN 1.5". There is no discrepency here, only confusion about the notation used in the Explanatory Supplement. I would have written the date in the above quote as "1899 DEC 31.5"

William Thompson

Subject: Re: Julian Day Numbers
Posted by Craig Markwardt on Tue, 14 Nov 2000 08:00:00 GMT
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Ben Tupper <pemaquidriver@tidewater.net> writes:

>> Thanks, JD, David (I think) and Craig,
>
> Yes, I agree that the IDL code does calculate what it claims to. My question
> was aimed (poorly) at which kind of Julian Day number IDL calculates.
> It sounds like it comes in many flavors. I'll punt.

No, there is only one flavor here, as long as we are talking about simple Julian Days. If you want January the *0th*, then you'd better enter it as such. Then you get the answer you'd expect:

IDL> Print, JulDay(1,0,1900,12,0,0)
      2415020.0

The strange thing is that January the 0th is really December 31st. Everybody I know starts counting calendar days with the number 1, so the 0th day of the month is actually the last day of the previous month. So it's strange that your almanac quoted that day instead of January the 1st.

There are other conventions, at least in astronomy. The Modified Julian Day (MJD) and Truncated Julian Day (TJD) are very similar time systems, the only difference being the zero-point. Thankfully these systems subtract the 0.5 day that makes standard Julian days so complicated and confusing. [A day changeover at *noon* ???]

Craig

P.S. Hmm, I had no place for sarcasm here. *(:-)

--
 -- --------------
Craig B. Markwardt, Ph.D.   EMAIL: craigmnet@cow.physics.wisc.edu

Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
 --- --------------

Subject: Re: Julian Day Numbers
Posted by Vapuser on Tue, 14 Nov 2000 08:00:00 GMT
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Ben Tupper <pemaquidriver@tidewater.net> writes:

<snip>

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> The IDL JULDAY code cites the following reference, but I don't
> have it handy to check into. ; Translated from "Numerical Recipies
> in C", by William H. Press, ; Brian P. Flannery, Saul A. Teukolsky,
> and William T. Vetterling. ; Cambridge University Press, 1988
> (second printing).
>

 Well, I just coded the julday subroutine given in _Numerical
 Recipes_ and ran it for 1999/01/01 and it comes out as 2415021. I
 also coded and ran the one line version given in _Spacecraft
 Attitude and Control_ and it comes out the same as the _Numerical...

 I also checked December 25, 1981, which _Spacecraft ... says should
 be 2444964, all three routines give the same (correct) answer.

 _Numerical... says May 23, 1968 is Julian Day 2440000, which checks
 out for all three routines.

 Might your reference be off?

whd
--
William Daffer: 818-354-0161: William.Daffer@jpl.nasa.gov

Subject: Re: Julian Day Numbers
Posted by Craig Markwardt on Tue, 14 Nov 2000 08:00:00 GMT
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"J.D. Smith" <jdsmith@astro.cornell.edu> writes:

> I see no reason to malign the IDL version of julday. This is a pretty

---

> simple calculation. Perhaps we should concentrate our frustrations on
> meatier IDL shortcomings. We could burn a z-buffer in effigy.

I dislike julday because it doesn't allow fractional days. I rarely
have my data with hh:mm:ss. Also it doesn't support vector arguments.
My main point was that there are other Julian-day calculators to
choose from.

On your second point, I don't know my Z-buffer from my A-hole. :-)

Craig

--
 -- -------------
Craig B. Markwardt, Ph.D.   EMAIL: craigmnet@cow.physics.wisc.edu
Astrophysics, IDL, Finance, Derivatives | Remove "net" for better response
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Subject: Re: Julian Day Numbers
Posted by davidf on Tue, 14 Nov 2000 08:00:00 GMT
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Ben Tupper (pemaquidriver@tidewater.net) writes:

> By the way, a totally off the subject matter that occured to me when I read
> David's post to JD's: perhaps the sarcasm dohicky symbol should be a
> dereferenced smiley face, something like... *(:-))   Better not make it a
> *:-) since that makes it look like a pom-pom... very unprofessional looking.

By the way, Ben, since the Chairman has run off (again)
with that hot looking secretary over in the bookstore, let
me be the first to congratulate you and Pavel for your
recent induction into the IDL Expert Programmer's
Association. Well done and I apologize for the 15
hand-counted ballots we had to take to be sure. All
in good time has always been our motto.

You will be getting the mimeographed instruction
sheet on how to perform the secret handshake soon.
Until you learn it, you and Pavel will be restricted to
no more than two off-topic posts a week. Of course,
once you have it down pat you can be as irrelevant
as the rest of us.

Cheers,

David

P.S. The best time to pick up my laundry and take
out the trash would be Tuesday mornings. :-)

--
David Fanning, Ph.D.
Fanning Software Consulting
Phone: 970-221-0438 E-Mail: davidf@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com/
Toll-Free IDL Book Orders: 1-888-461-0155

Subject: Re: Julian Day Numbers
Posted by Ben Tupper on Tue, 14 Nov 2000 08:00:00 GMT
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Thanks,

Ben

--
Ben Tupper
248 Lower Round Pond Road
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Bristol, ME 04539

Tel: (207) 563-1048
Email: PemaquidRiver@tidewater.net

Subject: Re: Julian Day Numbers
Posted by John-David T. Smith on Tue, 14 Nov 2000 08:00:00 GMT
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Craig Markwardt wrote:
>
> Hi Ben--
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> You need to be careful with your notations. Jan 1, 1900, 12noon, is
> different from Jan 0, 1900, 12noon. In fact, Jan 0 is the same as Dec
> 31 of the previous year, since we normal humans start our
> day-numbering system with 1. So in fact the IDL JULDAY function is
> operating correctly.
>
> There are a lot of astronomy-related julian date calculators which can
> be found on the U of W search page. You might trust these a little
> more than RSI's since they are used by real scientists :-) I have my
> own which I can send along if desired. However they all will still
> give 2415021 for the example you reported.

I see no reason to malign the IDL version of julday. This is a pretty
simple calculation. Perhaps we should concentrate our frustrations on
meatier IDL shortcomings. We could burn a z-buffer in effigy.

JD

--
 J.D. Smith | WORK: (607) 255-6263
 Cornell Dept. of Astronomy | (607) 255-5842
 304 Space Sciences Bldg. | FAX: (607) 255-5875
 Ithaca, NY 14853 |

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Posted by Craig Markwardt on Tue, 14 Nov 2000 08:00:00 GMT
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Craig

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Subject: Re: Julian Day Numbers
Posted by davidf on Tue, 14 Nov 2000 08:00:00 GMT
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J.D. Smith (jdsmith@astro.cornell.edu) writes:

> IDL just cribbed the code from Numerical recipes, which itself cribbed
> the code from somewhere else. They state: "A convenient reference
> points is that Julian Day 2440000 began at noon of May 23, 1968". If
> you give that a try, you find IDL has correctly implemented the NR
> routine. This leaves the question of the Astronomical Almanac. Since
> virtually everyone agrees (there are hundreds of julian calculators on
> the net) on the julian scale but AA, we have to presume (horrors), that
> it is in error.

Maybe we should hand count the days until we get it right. :-)

Cheers,

David
--
David Fanning, Ph.D.
Fanning Software Consulting
Phone: 970-221-0438 E-Mail: davidf@dfanning.com
Coyote's Guide to IDL Programming: http://www.dfanning.com/
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Subject: Re: Julian Day Numbers
Posted by Vapuser on Wed, 15 Nov 2000 08:00:00 GMT
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Craig Markwardt <craigmnet@cow.physics.wisc.edu> writes:

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> There are other conventions, at least in astronomy. The Modified
> Julian Day (MJD) and Truncated Julian Day (TJD) are very similar time
> systems, the only difference being the zero-point. Thankfully these
> systems subtract the 0.5 day that makes standard Julian days so
> complicated and confusing. [A day changeover at *noon* ???]

 But I thought the Julian Day was created by astronomers to prevent a
 day changeover in the middle of the night, i.e. during one observing
 session! Have I been living a lie all this time!

 I feel *so used*!

whd
--
William Daffer: 818-354-0161: William.Daffer@jpl.nasa.gov

Subject: Re: Julian Day Numbers
Posted by James Kuyper on Wed, 15 Nov 2000 08:00:00 GMT
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Craig Markwardt wrote:
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> Everybody I know starts counting calendar days with the number 1, so
> the 0th day of the month is actually the last day of the previous
> month. So it's strange that your almanac quoted that day instead of
> January the 1st.

Not really. What the almanac referenced was not Jan 0, but Jan 0.5 1900,
which is the start of the julian day that contains half of Jan 1,1900.

1899-12-31T12Z: 2415020.0 (Jan 0.5 1900)
1900-01-01T00Z: 2415020.5
1900-01-01T12Z: 2415021.0

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> Julian Day (MJD) and Truncated Julian Day (TJD) are very similar time
> systems, the only difference being the zero-point. Thankfully these
> systems subtract the 0.5 day that makes standard Julian days so
> complicated and confusing. [A day changeover at *noon* ???]

It was developed by European astronomers in the days when only
ground-based optical telescopes were in use. The only European
astronomers actively collecting data at noon GMT were studying the Sun.

Subject: Re: Julian Day Numbers
Posted by LC's No-Spam Newsread on Wed, 15 Nov 2000 08:00:00 GMT
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On 14 Nov 2000, Craig Markwardt wrote:

> No, there is only one flavor here, as long as we are talking about
> simple Julian Days.

and here we are (for some reason a lot of people refer to JDs are the
number of days in the year which is wrong). The definition taken from
the Astronomical Almanac (I happen to have the 1993 issue on my desk,
but the definition did not change since more than 400 years) is "the
interval of time in days and fraction of a day since 4713 BC January 1,
Greenwich noon, Julian proleptic calenda" (page M6 of the Almanac).

!!!!!!!!!!!!!!

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> systems subtract the 0.5 day that makes standard Julian days so
> complicated and confusing. [A day changeover at *noon* ???]

Yes, there are more modern conventions like MJD which subtract a
constant, and invariably this constant is some integer plus 0.5.

There was a couple of historical reasons to start a time scale at noon
(which is indeed what happens for "real" JDs) : one was that noon is
easier to measure than any other phenomenon (culmination of a star ?),
you just take when the Sun is highest in the sky. The other was that it
was convenient for observers to count a single night with one number, so
if they say zero at noon there is no changeover during an observing run.

Both arguments are now obsolete, and that's why MJD subtracts 2400000.5

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> Everybody I know starts counting calendar days with the number 1, so
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> month. So it's strange that your almanac quoted that day instead of
> January the 1st.

I've just checked (page B4 on the Almanac) and I see indeed that among
many reference dates it quotes 1900 Jan 0 12 h UT as 2415020.0. That's
noon of Dec 31, which is when JD is an integer. It is correct, although
funny. All other dates on the same page are quoted at 0 UT (and their JD
therefore ends in 0.5.

I would have used 1900 Jan 1 0 UT as 2415020.5 (which is indeed what
returns a program of mine which I hacked somewhere) ... but that's
exactly the same thing.

And my old IDL 4 doc for julday clearly (re)states that JD begins at
noon.

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 -- ----------
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avoid unwanted spam. Any mail returning to this address will be rejected.
Users can disclose their e-mail address in the article if they wish so.